

INDOOR AIR QUALITY ASSESSMENT

**Canton Public Library
378 Washington Street
Canton, Massachusetts**



Prepared by:
Massachusetts Department of Public Health
Center for Environmental Health
Bureau of Environmental Health Assessment
Emergency Response/Indoor Air Quality Program
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Background/Introduction

In response to a request from Mr. John Ciccotelli, Health Agent, the Massachusetts Department of Public Health (MDPH), Bureau of Environmental Health Assessment (BEHA) provided assistance and consultation regarding indoor air quality at the Canton Public Library (CPL), 378 Washington Street, Canton, Massachusetts. On February 6, 2004, Michael Feeney, Director of BEHA's Emergency Response/Indoor Air Quality (ER/IAQ) Program, conducted an evaluation. The request was prompted by mold concerns resulting from water damage to porous building materials (e.g. gypsum wallboard, carpeting).

The CPL is a two-story structure with a finished, basement/ground floor. The CPL was constructed in 1903 and renovated in 2003. During the 2003 renovations, a new heating, ventilating and air-conditioning (HVAC) system was installed. As reported by CPL staff, a coil within an air-handling unit (AHU) froze during the extreme cold weather experienced in New England in January, 2004 (Picture 1). As a result of the coil bursting, water saturated the interior of the building on the first and ground floors. At the time of the assessment, the CPL was undergoing an extensive remediation effort to dry and/or remove water contaminated building components.

Methods

Water content of gypsum wallboard (GW) was measured with a Delmhorst, BD-2000 Model, Moisture Detector with a Delmhorst Standard Probe. Air tests for

temperature and relative humidity were taken with the TSI, Q-Trak, IAQ Monitor, Model 8551.

Results

The building was evaluated on a rainy day, with an outdoor temperature of 32 ° F and relative humidity of 96 percent. The building was closed to the public during remediation therefore was not operating under normal working conditions. Indoor temperatures ranged from of 66° F to 79 ° F. Indoor relative humidity was measured in a range of 18 to 25 percent (Table 1).

Discussion

As discussed, the CPL had experienced water damage from the coil freezing, reportedly occurring on January 12, 2004. Remediation efforts to remove water damaged carpeting and GW were substantially completed at the time of the assessment (Pictures 2-4). GW had been removed to a height of one foot above the floor in the first floor and ground levels (Pictures 2 and 3). Carpeting in this area was removed as well.

An evaluation of moisture content in a number of building materials in the CPL was conducted to determine whether remaining moistened materials were in need of removal. A Delmhorst probe was inserted into the surface of GW. The Delmhorst probe is set to sound a signal when a moisture reading ≥ 0.5 percent in GW is detected. To assess whether GW in the CPL was dry, moisture content was measured in areas

immediately adjacent to the removed GW. Moisture content of remaining GW was comparable to non-moistened GW in other areas of the library, indicating that building components were dry. No active leaks or moisture sources were observed during the assessment.

The normal operation of a heating, ventilating and air-conditioning (HVAC) system during weather periods with high relative humidity can contribute to moisture in a building. As relative humidity levels increase indoors, porous building materials, such as GW, can absorb moisture. The moisture content in GW can fluctuate with increases/decreases in indoor relative humidity.

In order for building materials to support mold growth, a source of water exposure is necessary. Identification and elimination of water moistening building materials is necessary to control mold growth. Identification of GW with increased moisture content over normal concentrations may indicate possible presence of mold growth. Identification of the location of GW with increased moisture levels can also provide clues concerning the source of water supporting mold growth.

The US Environmental Protection Agency and the American Conference of Governmental Industrial Hygienists (ACGIH) recommends that porous materials be dried with fans and heating within 24 to 48 hours of becoming wet (US EPA, 2001; ACGIH, 1989). If porous materials are not dried within this time frame, mold growth may occur. Water-damaged porous materials cannot be adequately cleaned to remove mold growth. The application of a mildewcide to moldy porous materials is not recommended.

Conclusions/Recommendations

At the time of the assessment, the CPL and its contractor, Reich Construction Management Services, had taken substantial steps towards removing water-damaged materials from the building. Since contractors were already conducting remediation measures, BEHA staff provided the following verbal recommendations to Mr. Ciccotelli, Reich representatives and CPL officials:

1. Continue with efforts to repair water damage.
2. Ensure that the efforts to remove water damaged building materials continue to conform with the recommendations concerning water damaged materials described in the document “Mold Remediation in Schools and Commercial Buildings” published by the US Environmental Protection Agency (US EPA, 2001) for further information on mold. Copies of this document are available from the US EPA website at:

http://www.epa.gov/iaq/molds/mold_remediation.html.

References

ACGIH. 1989. Guidelines for the Assessment of Bioaerosols in the Indoor Environment. American Conference of Governmental Industrial Hygienists, Cincinnati, OH.

US EPA. 2001. "Mold Remediation in Schools and Commercial Buildings". Office of Air and Radiation, Indoor Environments Division, Washington, DC. EPA 402-K-01-001. March 2001. Available at: http://www.epa.gov/iaq/molds/mold_remediation.html

Picture 1



AHU with Frozen Coil above Water Damaged First Floor Area

Picture 2



Room Typical of Gypsum Wallboard and Carpet Removal

Picture 3



Hallway Typical of Gypsum Wallboard and Carpet Removal

Picture 4



Examination Holes Opened in Ductwork below AHU with Frozen Coil, Note Removed Ceiling Tiles

Canton Public Library**378 Washington Street, Canton, Massachusetts****Sampling Results****February 6, 2004****Table 1**

Location	Temperature (° F)	Relative Humidity (%)	Wallboard Moisture Concentration (%)	Remarks Damaged Materials Removed
Background/Outside	32	96		
Art & Music Section	66	25	0.1 – 0.3	
Fiction	68	23	0.1 – 0.3	Gypsum Wallboard
Front Desk	68	23	0.1 – 0.3	
Circulation Desk	69	23	0.1 – 0.3	
Foyer	70	22	0.1 – 0.3	
Media	69	22	0.1 – 0.3	Ductwork, Carpet, Ceiling Tiles, Gypsum Wallboard
Young Adult	71	21	0.1 – 0.3	Carpet, Gypsum Wallboard
Reference Room	72	20	0.1 – 0.3	
Computer Center	72	21	0.1 – 0.3	Gypsum Wallboard
2 nd Floor Stack Area	76	20	0.1 – 0.3	
2 nd Floor Office	79	19	0.1 – 0.3	
Children's Library	73	18	0.1 – 0.3	Carpet, Gypsum Wallboard
Story & Craft	73	18	0.1 – 0.3	
Community Room	70	18	0.1 – 0.3	Carpet, Ceiling Tiles, Gypsum Wallboard
Ground Floor Elevator Foyer	71	20	0.1 – 0.3	Carpet, Gypsum Wallboard

Table 1-1